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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/826,503	04/05/2001	Charles H. Carter JR.	CM03024J	7883

7590 05/24/2007
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EXAMINER

SWORDLOW, DANIEL

ART UNIT	PAPER NUMBER
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2615

MAIL DATE	DELIVERY MODE
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05/24/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/826,503
Filing Date: April 05, 2001
Appellant(s): CARTER, CHARLES H.

MAIL

MAY 24 2007

Technology Center 2600

Ms. Barbara R. Doutre, reg. No. 39,505
For Appellant

EXAMINER'S ANSWER

MAILED

MAY 24 2007

Technology Center 2600

This is in response to the appeal brief filed 14 February 2007 appealing from the Office action mailed 7 September 2005.

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(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

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(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,771,297	Richardson	6-1998
3,912,880	Powter et al.	10-1975
5,881,103	Wong et al.	3-1999
5,481,615	Eatwell et al.	6-1996
4,631,749	Rapaich	12-1986

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Richardson (USPN 5771297) in view of Powter et al (USPN 3912880).

Richardson discloses a system for adjusting the parameters of an audio signal applied to a loudspeaker in a radio device in regards to various operation conditions, including loudspeaker deficiencies.

Regarding Claim 8, Richardson teaches:

A method of acoustic transducer calibration (function of filter 8, col. 3, lines 38-41) for optimizing the frequency response and gain of an internal speaker (17)(receives output of 8; col. 4, lines 23-25 and 50-53) located within a portable communication device (col. 2, lines 16-17; col. 3, lines 26-29) comprising the steps of:

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generating a source (“training audio sequence”) from at least one digital signal processor (50) located in the portable communications device (col. 3, lines 66-67; col. 4, lines 1-2); providing the training audio sequence to the internal speaker (12)(col. 4, lines 2-4);

directing the training audio sequence from the internal speaker to a microphone in the portable communications device (col. 4, lines 9-10);

porting the output of the internal speaker to the at least one digital signal processor (col. 2, lines 10-11; Figure 3);

comparing (function of 15) the source with an output of the at least one digital signal processor (col. 2, lines 7-14; col. 4, lines 10-17); and

adjusting a plurality of coefficients in the at least one digital signal processor based upon differences in the source and the output of the at least one digital signal processor (col. 4, lines 12-20) to produce an optimized internal speaker output for the portable communications device (col. 4, lines 50-53).

However, while Richardson discloses the “training [audio] sequence may be a complex audio waveform, for example a swept two-tone and/or single tone sweep, and several sequences could be used” (col. 4, lines 2-9), Richardson does not clearly specify

- that the training audio sequence is an acoustic pseudo random noise

Powter discloses an acoustic measurement system that involves the generation of a pseudo random bit sequence that is converted to an audio signal.

Specifically regarding Claim 8, Powter teaches:

generating a source of acoustic pseudo random noise (col. 3, lines 11-31)

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to utilize a pseudo random sequence generated signal, such as generated in the system of Powter, for the training sequence associated with an embodiment of the system of Richardson. The motivation behind such a modification, as detailed in Powter at col. 2 line 64 through col. 3, line 31 would have been that such a pseudo random sequence would have provided a single, stable training signal with plurality of represented frequencies for the frequency based comparison of the system of Richardson that avoids the necessity of repeated scans of the acoustic spectrum.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Richardson in view of Powter as applied above, and in further view of Wong et al (USPN 5881103).

As detailed above, Richardson discloses a system for adjusting the parameters of an audio signal applied to a loudspeaker in a radio device in regards to various operation conditions, including loudspeaker deficiencies. Powter discloses an acoustic measurement system that involves the generation of a pseudo random bit sequence that is converted to an audio signal.

Specifically regarding Claim 5, Richardson in view of Powter teaches:

A method of acoustic transducer calibration (function of filter 8, col. 3, lines 38-41 of Richardson) for tuning an internal microphone and internal speaker (12,13 of Richardson)(12 receives output of 8, based on frequency response of 13, so far as frequency response of 13 influences comparison by 50 of input signal, tuning of 50 for storage in 51 is done according to 13 as well as 12; col. 4, lines 23-25 and 50-53 of Richardson) in a portable two-way radio (col. 2, lines 16-17; col. 3, lines 26-29 of Richardson) without the use of test equipment (device in single housing, col. 2, lines 16-17) comprising the steps of:

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supplying a source of pseudo random noise from at least one digital signal processor (at least part of circuitry of 50)(col. 4, lines 2-4 of Richardson in view of type of sequence of Powter, col. 3, lines 11-31 of Powter);

directing the compensated pseudo random noise signal to a the internal microphone associated with the portable two-way radio (col. 4, lines 9-10);

filtering the output of the internal microphone to provide a compensated microphone signal (function of 14, Figure 3; col. 3, lines 7-10 and 34-36 of Richardson);

supplying the compensated microphone signal to the at least one digital signal processor (col. 3, lines 56-59 of Richardson);

comparing the output of the source of pseudo random noise (from 14) with an output of the at least one digital signal processor (col. 2, lines 10-14; col. 4, lines 9-12 of Richardson);

compensating a plurality of filter coefficients in the at least one digital signal processor (stored in 51) based upon differences in the source of the pseudo random noise and an output of the at least one digital signal processor (col. 4, lines 12-20 of Richardson); and

stopping the source of pseudo random noise (col. 4, lines 20-22 of Richardson); and

returning the portable two-way radio to an operational mode (col. 4, lines 22-23 of Richardson).

Richardson also notes that several transducers may be used with a device (col. 5, lines 5-9).

Richardson in view of Powter does not clearly specify:

- filtering the pseudo random noise to provide a compensated pseudo random noise signal;
- supplying the compensated pseudo random noise signal to a speaker external to the portable two-way radio;

Wong discloses a method and system for adjusting the signal processing of a portable communications devices which is connected to a plurality of auxiliary input and output signal devices.

Specifically regarding Claim 5, Wong teaches:

filtering the pseudo random noise ("sample signal") to provide a compensated pseudo random noise signal (application of sample signal to accessory, such as 130, the path of which comprises filter 454; col. 3, lines 62-66; col. 4, lines 31-39);

supplying the compensated pseudo random noise signal (output of 454) to a speaker external (451) to the portable two-way radio (110) (col. 3, lines 62-67; col. 4, lines 1-3).

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to incorporate the accessory speaker of Wong as one of the transducers utilized in a portable communications device embodiment of the teachings of Richardson in view of Powter. The teachings of Richardson make an allowance for additional transducers, as is noted above. The motivation behind the use of such a particular additional accessory such as that taught by Wong, would have been the inclusion of an output device with a configuration or function not included in the communication device. The accessory disclosed by Wong would have also enabled such additional function or configuration to be adapted to the collective equalization parameters of the input and output devices used in the system.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Richardson in view of Powter and Wong as applied above, and in further view of Eatwell et al (USPN 5481615).

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As detailed above, Richardson discloses a system for adjusting the parameters of an audio signal applied to a loudspeaker in a radio device in regards to various operation conditions, including loudspeaker deficiencies. Powter discloses an acoustic measurement system that involves the generation of a pseudo random bit sequence that is converted to an audio signal. Wong discloses a method and system for adjusting the signal processing of a portable communications devices which is connected to a plurality of auxiliary input and output signal devices.

While the system of Richardson discloses the comparison of an initially output signal and a received version of the same output signal, particular details regarding the timing of the involved, compared signals is not provided.

As such, Richardson in view of Powter and Wong do not clearly specify:

delaying (function of 4) the source of pseudo random noise compared with the output of the at least one digital signal processor (col. 3, lines 62-67; col. 4, lines 1-7, in view of the output of a test signal as particularly taught by Richardson).

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to include at least a delay component between the input of the amplifier (7) and the comparison circuit (15) of the system of Richardson in view of Powter and Wong. The motivation behind such a modification would have been that such a delay would have provided compensation for the non-ideal response of the test signal reception path and components of the system of Richardson in view of Powter and Wong.

Claims 7, 1, 3, 4, are rejected under 35 U.S.C. 103(a) as being unpatentable over Richardson in view of Powter and Wong as applied above, and in further view of Rapaich (USPN 4631749).

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As detailed above, Richardson discloses a system for adjusting the parameters of an audio signal applied to a loudspeaker in a radio device in regards to various operation conditions, including loudspeaker deficiencies. Powter discloses an acoustic measurement system that involves the generation of a pseudo random bit sequence that is converted to an audio signal. Wong discloses a method and system for adjusting the signal processing of a portable communications devices which is connected to a plurality of auxiliary input and output signal devices.

Specifically regarding Claim 7, please refer above to the rejection of the similar limitations of Claims 5 and 8 regarding the “method”, “generating”, “providing”, “directing”, “porting”, and “comparing”.

Richardson particularly teaches:
adjusting a plurality of coefficients (stored in 51) in the at least one digital signal processor based upon differences in the acoustic pseudo random noise and the output of the at least one digital signal processor (col. 4, lines 12-20)

However, Richardson in view of Powter and Wong do not specify:

- that the adjusting of the coefficients produces an optimized microphone output for the portable communications device.

Rapaich teaches system for compensating an input microphone associated with frequency analysis components.

Specifically regarding Claim 7, Rapaich teaches:
adjusting a plurality of coefficients (stored in 52) in the at least one digital signal processor based upon differences in the acoustic pseudo random noise and the output of the at least one digital

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signal processor (col. 7, lines 39-68, in view of Richardson) to produce an optimized microphone output for the portable communications device (col. 5, lines 30-47).

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to associate coefficients in the DSP in the system of Richardson in view of Powter and Wong with the filtering characteristics of the microphone input filter (14), as is suggested by the teachings of Rapaich. To one of ordinary skill in the art at the time the invention was made, it would have been obvious to make the characteristics associated with the input filter (14) of Richardson programmable in order to compensate for the non-linear operating characteristics of the input microphone. Such compensation would have at least enabled the frequency analysis, if not the other processing associated with the microphone input, performed by the system of Richardson in view of Powter and Wong, to be performed according to detected frequency characteristics of a signal not degraded by the input components.

Regarding Claim 1, Richardson in view of Powter, Wong, and Rapaich teaches:

A method for acoustic transducer calibration in a portable communications device (function of filter 8, col. 3, lines 38-41; col. 2, lines 16-17; col. 3, lines 26-29 of Richardson) comprising the steps of:

providing a source of pseudo random acoustical noise (col. 4, lines 2-4 of Richardson in view of col. 3, lines 11-31 of Powter) to an characterized external speaker source separate from the portable communications device (application of sample signal; col. 4, lines 33-35 of Wong, in view of signal output of Richardson, col. 4, lines 2-4)

directing the pseudo random acoustical noise to an input of a an internal microphone used with the portable communications device (col. 4, lines 9-12 of Richardson),

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adjusting first coefficients in at least one digital signal processor connected to the internal microphone for a desired microphone frequency response based upon the input of pseudo random acoustical noise (col. 7, lines 29-59 of Rapaich);

discontinuing the source of pseudo random acoustical noise from the external speaker source (col. 4, lines 2-23 of Richardson in view of col. 4, lines 37-41 of Wong),

applying the source of pseudo random acoustical noise to an internal speaker source in the portable communications device (col. 4, lines 2-4 of Richardson in view of col. 5, lines 1-8 of Richardson),

increasing the amplitude of the pseudo random acoustic noise such that it can be detected by the internal microphone (col. 2, lines 22-30);

adjusting second coefficients in the at least one digital signal processor for a desired internal speaker frequency response based upon the input of the pseudo random acoustical noise (col. 2, lines 25-33; col. 4, lines 12-20 and 40-43 of Richardson);

returning the portable communications device to an operational mode (col. 4, lines 23-25 of Richardson), and

utilizing a filter (454) between the source of pseudo random acoustical noise (generated by a DSP, such as in Richardson, col. 4, lines 2-4) and the external speaker (451) to compensate for irregularities in the frequency response of the external speaker (col. 3, lines 62-67; col. 4, lines 1-3 and 45-49 of Wong in view of the teaching that the comparison of values by 15 in Richardson is based on signals output by filter 8; col. 2, lines 61-66 and col. 3, lines 30-43, Figure 3).

Regarding Claim 3, Richardson particularly teaches:

comparing (function of 15) the output of the at least one digital signal processor (input to 7) with an optimal acoustic signal from the output of the pseudo random acoustic noise (received by 13) to provide an error signal (outputs of 30,31, Figure 3) for adjusting the coefficients (stored in 51) of the at least one digital signal processor (50)(col. 2, lines 18-21; col. 3, lines 30-43; col. 4, lines 9-20; Figures 3 and 4).

Regarding Claim 4, Richardson particularly teaches:
wherein the source of pseudo random noise is from the at least one digital signal processor (col. 4, lines 2-8).

(10) Response to Argument

With respect to Claim 8, appellant alleges in the first complete paragraph on page 9 of the appeal brief that “[t]he microphone of Richardson is used as feedback to monitor a response, not for calibration of the speaker”. Examiner respectfully disagrees. As is most clearly shown in Fig. 3 in Richardson, the microphone is used during a specific training period to determine a frequency characteristic of the speaker and adjust the characteristic of a filter 8 in accordance with the loudspeaker characteristic to avoid operation of the loudspeaker at frequency and amplitude combinations that cause distortion (col. 3, lines 34-42). Because the audio signal driving the loudspeaker passes through the filter 8, the adjustment of the filter during a specific training period represents a calibration of the loudspeaker, as claimed. Further, appellant alleges that “the test microphone of Richardson is not the equivalent of [appellant’s] portable communication devices internal microphone” and “Richardson’s electronic device...requires an additional

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internal microphone”. Examiner respectfully disagrees. Richardson discloses at col. 3, lines 27-29:

Note that in a portable communications device it is evident that the microphone may also serve for the transmitter input transducer by the use of further switching and appropriate control circuits not illustrated.

As such, Richardson clearly discloses use of a single microphone for loudspeaker calibration and portable communication device voice input.

In the first paragraph on page 10 of the appeal brief, appellant makes allegation regarding the teachings of Powter. However, since these teachings are provided by Richardson, these allegations are moot. As clearly shown in the grounds of rejection, Powter is relied on only for teaching and motivation for the use of a pseudo random noise signal as the training audio sequence. Appellant does not dispute that Powter provides this teaching and motivation.

With respect to Claim 5, in the first complete paragraph on page 11 of the appeal brief, appellant repeats the baseless allegation that “[t]here is no teaching or suggestion that the Richardson microphone (13) can be used for internal microphone for two-way radio operation. Indeed, microphone (13) cannot function in this capacity as it is used only for feedback to the transducer (12) -as such Richardson's microphone can only operates as a test microphone”. Again, examiner refers to the Richardson disclosure at col. 3, lines 27-29:

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Note that in a portable communications device it is evident that the microphone may also serve for the transmitter input transducer by the use of further switching and appropriate control circuits not illustrated.

In the second complete paragraph on page 11 of the appeal brief, appellant alleges that the cited prior art fails to disclose filtering the output of the internal microphone to provide a compensated microphone signal, as claimed. Examiner respectfully disagrees. Figure 3 of Richardson clearly depicts the filtering at block 14 of the output of the microphone when the sequence control switch is in the position to use the microphone to sense the loudspeaker output.

With respect to Claim 6, appellant's arguments made in the last complete paragraph on page 11 of the appeal brief are limited to alleging patentability of Claim 6 due to dependence from Claim 5. As shown above, Claim 5 is not patentable.

With respect to Claims 7, 1, 3 and 4, on pages 12 and 13 of the appeal brief, appellant makes generalized allegations that the cited prior art does not disclose "that which is claimed". Absent more specific arguments from appellant, the statements made above under Grounds of Rejection are sufficient. Appellant alleges that "neither Richardson nor Powter optimize a microphone" and "Wong does not calibrate a microphone". As shown above under Grounds of Rejection, these elements are taught in Rapaich. Appellant alleges that "Wong requires the use of a reference audio response". There is nothing in the claims that excludes such an arrangement.


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(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,



Daniel Swerdlow

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Conferees:



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